

CLAIMS

1-87 (Cancelled)

88. (Currently amended) A system for converting fuel energy to electricity, comprising:

a reformer for converting a higher molecular weight gas into at least one mixed gas stream of lower average molecular weight comprising at least a first lower molecular weight gas and a second gas, said first and second gases being different gases;

at least one turbine to produce electricity from expansion of said mixed gas stream;

a separator for dividing said mixed gas stream into a first gas stream mainly comprising said first lower molecular weight gas and a second gas stream mainly comprising said second gas; [[and,]]

a first fuel cell for electrochemically oxidizing said first gas stream to produce electricity, and

a second fuel cell for electrochemically oxidizing said second gas stream to produce electricity.

89. (Original) The system for converting fuel energy to electricity of claim 88, wherein said separator comprises at least one selected from the group consisting of carbon fiber composite molecular sieves (CFCMS) and inorganic membranes.

90. (Currently amended) The system for converting fuel energy to electricity of claim 88, wherein said [[at]] fuel cells are both solid oxide fuel cells.

91. (Original) The system for converting fuel energy to electricity of claim 88, further comprising structure for directing at least a portion of heat generated by said fuel cells to said reformer.

92. (Original) The system for converting fuel energy to electricity of claim 88, further comprising a nuclear reactor for generating heat.

93. (Original) The system for converting fuel energy to electricity of claim 92, wherein at least a portion of said heat is directed to said reformer to heat said higher molecular weight gas.

94. (Original) The system for converting fuel energy to electricity of claim 88, wherein said higher molecular weight gas is provided by a pipeline which provides pressurized natural gas, said mixed stream being directly provided to said turbine from said reformer without additional steps for either compressing or heating said mixed gas stream.

95. (Original) The system for converting fuel energy to electricity of claim 88, wherein said high molecular weight gas principally contains methane and is reformed by said reformer, wherein said first lower molecular weight gas comprises H₂ and said second gas comprises CO.

96. (Original) The system for converting fuel energy to electricity of claim 88, wherein said first and second fuel cells comprise solid oxide fuel cells.

97. (Original) The system for converting fuel energy to electricity of claim 88, wherein at least one of said first and second fuel cells produces a CO₂ output, wherein expansion of said CO₂ is used to produce additional energy.

98. (Original) The system for converting fuel energy to electricity of claim 88, further comprising a combustion chamber, wherein output streams from at least one of said fuel cells are supplied to said combustion chamber for oxidation of fuel which has not been fully oxidized.

99. (Original) The system for converting fuel energy to electricity of claim 88, wherein said first and second fuel cells comprise H₂ and CO fuel cells, respectively, and air is supplied to both said first and second fuel cells, said air first being supplied to said CO fuel cell and then to said H₂ fuel cell.

100. (Original) The system for converting fuel energy to electricity of claim 99, wherein said air is supplied to a device for providing oxygen enriched air prior to delivery to said fuel cells.

101. (Original) The system for converting fuel energy to electricity of claim 88, wherein said higher molecular weight gas is a hydrocarbon containing gas principally comprising methane.

102. (Currently amended) The system for converting fuel energy to electricity of claim 101, wherein said hydrocarbon containing gas is natural gas, said natural gas being supplied to said reformer at a pressure of at least approximately 40 atmospheres.

103. (New) A system for converting fuel energy to electricity, comprising:
a coal gasifier for generating a synthesis gas stream from coal, said synthesis gas comprising primarily H₂ and CO;
at least one turbine to produce electricity from expansion of said synthesis gas;
a separator for dividing said synthesis gas into a first gas stream mainly comprising H₂ and a second gas stream mainly comprising CO;
a first fuel cell for electrochemically oxidizing said H₂ to produce electricity, and
a second fuel cell for electrochemically oxidizing CO to produce electricity.